

CLAIMS

We claim:

1. A dielectric resonator circuit comprising:
a housing; and
a plurality of dielectric resonators arranged relative to each other to provide coupling therebetween, wherein said dielectric resonators are adjustable relative to each other.
2. The dielectric resonator circuit of claim 1 wherein each dielectric resonator has a longitudinal axis defined orthogonal to the field of the fundamental mode of the dielectric resonator and wherein said dielectric resonators are adjustable at least along their longitudinal axes.
3. The dielectric resonator circuit of claim 2 wherein said dielectric resonators are cylindrical and said longitudinal axes are along the height of said cylindrical dielectric resonators.
4. The dielectric resonator circuit of claim 3 wherein said dielectric resonators are conical and said longitudinal axes are along the height of said conical dielectric resonators.
5. The dielectric resonator circuit of claim 2 wherein said dielectric resonators are mounted in a radial pattern with their longitudinal axes substantially in the same plane and intersecting at a central point.

6. The dielectric resonator circuit of claim 5 wherein said housing comprises a radial wall and each dielectric resonator is mounted to said housing via a threaded post mounted in a matingly threaded hole in said radial wall, whereby said positions of said resonators can be adjusted along their longitudinal axes by rotation of said screws relative to said housing.

7. The dielectric resonator circuit of claim 6 wherein said holes in said radial wall of said housing are through holes so that said posts may protrude outwardly from said housing.

8. The dielectric resonator circuit of claim 2 wherein said dielectric resonators are positioned relative to each other so that they overlap each other in a plane parallel to said longitudinal axes.

9. The dielectric resonator circuit of claim 8 wherein said dielectric resonators are conical.

10 The dielectric resonator circuit of claim 9 wherein said dielectric resonators are comprised of a plurality of layers.

11 The dielectric resonator circuit of claim 1 wherein the distance between said dielectric resonators in a plane of said fields of the fundamental modes of the dielectric resonators is adjustable.

12. The dielectric resonator circuit of claim 13 wherein each dielectric resonator has a longitudinal axis defined orthogonal to the field of the fundamental mode of the dielectric resonator and wherein said dielectric resonators are tiltably

adjustable such that the longitudinal axes of the dielectric resonators are variable relative to each other.

13. The dielectric resonator circuit of claim 1 wherein each dielectric resonator has a longitudinal axis defined orthogonal to the field of the fundamental mode of the dielectric resonator, and wherein said adjustability is in the plane of said fields and in the direction between said dielectric resonators.

14. The dielectric resonator circuit of claim 13 further comprising:
at least one slot positioned in a wall of said housing, said resonators slidably supported on the housing in said at least one slot so as to provide said transverse adjustability.

15. The dielectric resonator circuit of claim 14 wherein each said dielectric resonator is supported in said slot via a post, said post slidably engaged within said slot.

16. The dielectric resonator circuit of claim 15 wherein each said post is threaded and further comprises a nut for selectively locking said post in a fixed position in said slot.

17. The dielectric resonator circuit of claim 15 wherein each said post forms a friction fit with said slot.

18. The dielectric resonator circuit of claim 15 wherein each said post is coupled within said slot via a gear assembly.

19. The dielectric resonator circuit of claim 1 wherein each resonator has a longitudinal axis defined orthogonal to the field of the fundamental mode of the dielectric resonator and wherein said dielectric resonators are tiltably adjustable such that the longitudinal axes of the dielectric resonators are variable relative to each other.

20. The dielectric resonator circuit of claim 19 wherein said dielectric resonators are tiltable in at least a plane that defines the shortest straight line distance between the first and second dielectric resonators.

21. The dielectric resonator circuit of claim 19 further comprising:
an internal wall within said housing between said first and second dielectric resonators, said wall having an iris.

22. The dielectric resonator circuit of claim 19 wherein;
said dielectric resonators are cylindrical with said longitudinal axes along the height of said cylindrical dielectric resonators and are longer in the longitudinal dimension than in the plane transverse to the longitudinal dimension; and
wherein said dielectric resonator circuit is a dual mode filter having first and second fundamental modes, said first and second fundamental modes orthogonally polarized H_{11} modes.

23. The dielectric resonator circuit of claim 19 further comprising:
a plurality of posts, each dielectric resonator mounted to said housing via one of said posts, wherein each post is adjustable relative to at least one of (a) said dielectric resonator mounted upon it and (b) said housing, so as to permit said dielectric resonators to be tiltably adjustable relative to each other.

24. The dielectric resonator circuit of claim 23 further comprising:
a ball joint between each said post and said corresponding dielectric resonator.

25. The dielectric resonator circuit of claim 1 wherein each dielectric resonator has a longitudinal axis defined orthogonal to the field of the fundamental mode of the dielectric resonator and includes an asymmetry that causes said field to be asymmetric orthogonal to said longitudinal axis, and wherein said dielectric resonators are rotatable about their longitudinal axes.

26. The dielectric resonator circuit of claim 25 further comprising:
a plurality of posts, each dielectric resonator mounted to said housing via one of said posts;

wherein each said post has a longitudinal axis oriented parallel to said longitudinal axis of said corresponding dielectric resonator and, wherein each post is rotatable relative to at least one of (a) said dielectric resonator mounted upon it and (b) said housing.

27. The dielectric resonator circuit of claim 26 further comprising:
a ball joint between each said post and said corresponding dielectric resonator, said ball joint providing said rotatable adjustability as well as tiltable adjustability between said dielectric resonators such that the longitudinal axes of the dielectric resonators are variable relative to each other.

28. The dielectric resonator circuit of claim 27 wherein said dielectric resonators are further adjustable relative to each other along said longitudinal axis.

29. The dielectric resonator circuit of claim 27 wherein the transverse distance between said dielectric in a plane of said field of the fundamental mode of the dielectric resonators is adjustable.

30. The dielectric resonator circuit of claim 28 wherein the distance between said dielectric resonators in a plane of said field of the fundamental mode of the dielectric resonators is adjustable.

31. A dielectric resonator circuit comprising:
a housing; and
a plurality of dielectric resonators arranged relative to each other to provide coupling therebetween, each dielectric resonator having a longitudinal axis defined orthogonal to the field of the fundamental mode of the dielectric resonator;
means for adjusting said dielectric resonators relative to each other in order to adjust coupling strength between said dielectric resonators.

32. The dielectric resonator circuit of claim 31 wherein each dielectric resonator has a longitudinal axis defined orthogonal to the field of the fundamental mode of the dielectric resonator and includes an asymmetry that causes said field to be asymmetric orthogonal to said longitudinal axis; and
wherein said means for adjusting comprises mounting means for mounting said dielectric resonators to said housing such that they are rotatable about their longitudinal axes.

33. The dielectric resonator circuit of claim 32 further comprising means for adjusting said dielectric resonators relative to each other along said longitudinal axis.

34. The dielectric resonator circuit of claim 32 further comprising means for adjusting the transverse distance between said dielectric resonators in a plane of said field of the fundamental mode of the dielectric resonators.

35. The dielectric resonator circuit of claim 33 further comprising means for adjusting the transverse distance between said dielectric resonators in a plane of said field of the fundamental mode of the dielectric resonators.

36. The dielectric resonator circuit of claim 32 further comprising means for tiltably adjusting said dielectric resonators such that the longitudinal axes of said dielectric resonators are variable relative to each other.

37. A dielectric resonator circuit comprising:

a housing; and

first and second pairs of dielectric resonators arranged to provide coupling between a fundamental mode of said first pair of dielectric resonators and a fundamental mode of said second pair of dielectric resonators, each pair having a fundamental mode field, each dielectric resonator of a dielectric resonator pair having a longitudinal axis defined orthogonal to the field of said fundamental mode of the dielectric resonator pair;

wherein said dielectric resonators of a dielectric resonator pair are adjustable relative to each other along said longitudinal axis, whereby a frequency of said fundamental mode is adjustable by adjusting a spacing along said longitudinal axes between said dielectric resonators of said dielectric resonator pair.

38. The dielectric resonator circuit of claim 37 further comprising:

a plurality of posts, each dielectric resonator mounted to said housing via one of said posts, wherein each post is adjustable relative to at least one of (a) said dielectric resonator mounted upon it and (b) said housing, so as to permit said dielectric resonators to be longitudinally adjustable relative to each other.

39. The dielectric resonator circuit of claim 38 wherein said housing comprises threaded holes and said posts are threaded to mate with said threaded holes whereby said positions of said resonators can be adjusted longitudinally by rotation of said screws relative to said housing.

40. The dielectric resonator circuit of claim 37 wherein said first dielectric resonator pair is adjustable relative to said second dielectric resonator pair along said longitudinal axes.

41. The dielectric resonator circuit of claim 37 wherein the transverse distance between said first dielectric resonator pair and said second dielectric resonator pair in a plane of said field of the fundamental mode of the dielectric resonator pairs is adjustable.

42. The dielectric resonator circuit of claim 40 wherein the transverse distance between said first dielectric resonator pair and said second dielectric resonator pair in a plane of said field of the fundamental mode of the dielectric resonator pairs is adjustable.